

## CLAIMS

What is claimed is:

1. A transdermal patch for delivery of a bio-active agent into the skin of a living body which patch is fastenable to a surface of the skin, the patch containing at least one agent storage pad positioned to dispense agent into the skin and containing electrically operated driver means for causing delivery of the stored agent from the storage pad into the skin and containing a battery for supplying electrical current to the driver means, further including:

a programmable digital data processor controlling dispensing of said agent by said reservoir pad and driver means,

an analysis unit for sensing the concentration of a substance in the body, said analysis unit providing concentration signals to said digital data processor enabling dispensing of said agent into the skin when said concentration is outside of a particular range of concentrations

said programmable digital data processor and said analysis unit being contained within said patch.

2. The transdermal patch of claim 1 wherein said patch contains a plurality of said agent storage pads each storing a different agent, further including a plurality of said electrically operated driver means each being operative on a separate one of said plurality of agent storage pads in response to actuating signals from said data processor.

3. The transdermal patch of claim 2 further including a radio receiver contained by said patch for receiving programming signals for said digital data processor to enable actuation of selected ones of said electrically operated driver means in response to radio signals originating at a location which is spaced apart from said patch.

4. The transdermal patch of claim 1 wherein said driver means includes a first driver electrode disposed against said agent storage pad in electrical

contact therewith at a first area of said skin and a second driver electrode positioned to be in electrical contact with a second area of said skin that is spaced apart from said first area.

5. The transdermal patch of claim 1 wherein said driver means includes an ultrasound generator disposed over said agent storage pad, said ultrasound generator being contained within said patch.

6. The transdermal patch of claim 1, said analysis unit having first and second spaced apart sensor electrodes within said patch which are positioned to establish an electrical current within a portion of the underlying skin to withdraw said substance through the skin, a collection pad within the patch which is positioned to receive the withdrawn substance, and a detector within the patch for detecting the concentration of said substance in said collection pad.

7. The transdermal patch of claim 6 wherein said detector comprises an infrared source at one side of said collection pad in position to direct infrared energy towards an infrared detector at an opposite side of said collection pad to detect the infrared absorption spectra of said substance in said collection pad including the intensity level of said infrared absorption spectra for analysis by said data processor.

8. The transdermal patch of claim 1 wherein said substance is glucose and wherein said bio-active agent is an insulin derivative drug.

9. The transdermal patch of claim 1 further including an internal radio transmitter for transmitting signals indicative of said concentration of said substance to a location which is spaced apart from said patch, said internal radio transmitter being contained within said patch.

10. The transdermal patch of claim 1 further including an internal radio transmitter and receiver contained within said patch, said internal radio transmitter and receiver being conditioned to transmit signals indicative of said concentration of said substance and to receive programming signals for said data processor, further including a remote radio transmitter and receiver situ-

ated apart from said patch and being conditioned to transmit said programming signals to said internal radio transmitter and receiver and to receive said signals indicative of said concentration of said substance.

11. The transdermal patch of claim 1 wherein said data processor is programmed to deliver repetitive doses of said agent at a repetition rate which corresponds to the rate at which the concentration of said agent in the body diminishes to a particular value.

12. The transdermal patch of claim 1, said data processor being programmed to vary the dosage of said agent during a period of time to conform to variations of the rate at which the agent is needed by the body during the period of time.

13. The transdermal patch of claim 1 wherein said agent storage pad is formed of a material which is impermeable by said bio-active agent in the absence of an electrical current and which becomes permeable by said bio-active agent when subjected to an electrical current.

14. The transdermal patch of claim 1 wherein said agent storage pad is bounded by a membrane, said membrane being a material which is permeable by said bio-active agent when subjected to an electrical current and which is impermeable by the bio-active agent in the absence of the electrical current, wherein said electrically operated driver means applies current to said membrane to enable release of the stored agent to the skin.

15. The transdermal patch of claim 1 wherein said agent storage pad is bounded by a membrane, said membrane being a material which is permeable when subjected to ultrasonic sound and which is impermeable in the absence of the ultrasonic sound, wherein said electrically actuated driver generates ultrasonic sound to enable release of the stored agent to the skin.

16. A transdermal patch for delivery of a bio-active agent into the skin of a living body which patch is fastenable to a surface of the skin, the patch containing at least one agent storage pad positioned to dispense agent into the

skin and containing electrically operated driver means for causing delivery of the stored agent from the storage pad into the skin and containing a battery for supplying electrical current to the driver means, further including:

- a programmable digital data processor controlling dispensing of said agent by said reservoir pad and driver means, and

- a radio receiver which inputs programming signals to said programmable digital data processor,

- said programmable digital data processor and said radio receiver being contained within said patch.

17. The transdermal patch of claim 15 further including a remote radio transmitter for transmitting said programming signals to said radio receiver, said radio transmitter being at a location which is spaced apart from said patch.